

CHARACTERISTICS OF RETINAL DETACHMENT PATIENTS AT PROF. dr. I GOESTI NGOERAH GDE NGOERAH GENERAL HOSPITAL IN 2021 – 2023

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ABSTRACT

Background: Retinal detachment is a serious ocular condition where the neurosensory layer of the retina separates from the posterior eye, leading to tissue death and potential permanent vision loss. With the increasing global prevalence of myopia, understanding the characteristics of retinal detachment patients is essential for clinical management and future research.

Methods: This descriptive observational study used a cross-sectional design. Total sampling was employed to collect data from medical records of retinal detachment patients at Prof. dr. I Goesti Ngoerah Gde Ngoerah General Hospital from 2021 to 2023. Data were analyzed using SPSS version 29.

Results: Among 85 patients, the majority were male (69.41%) and aged 50–60 years (38.8%). The most common etiology was unknown (51.8%), followed by myopia and diabetic retinopathy (14.12% each). Rhegmatogenous retinal detachment was predominant (70.6%). The temporal area was the most frequent detachment location (61.7%), with break morphology (68.3%). Laterality was most common in Oculus Dexter (47.1%). Visual acuity severity of NLP–1/300 was found in 62.4% of patients. Pars Plana Vitrectomy was the most performed procedure (92.9%).

Conclusions: The majority of retinal detachment patients were male, aged 50–60 years, with rhegmatogenous type, temporal detachment, break morphology, unilateral Oculus Dexter involvement, severe visual impairment, and managed with Pars Plana Vitrectomy.

Keywords: Retinal detachment, morphology, visual acuity severity

INTRODUCTION

One international news headline reads, "The World Going Blind" to represent numerous studies worldwide that warn about the rising prevalence of myopia and its complications in various countries.¹ Myopia is a condition where the eye cannot see objects at a certain distance, caused by the image of the object falling in front of the retina. This condition leads to various complications.² Retinal detachment is one of the common complications of myopia, with myopia accounting for up to 50% of the underlying causes of various related diseases.³

Retinal detachment is a serious ocular disorder that can result in irreversible blindness. When the retina, which is the neurosensory layer, separates from the back of the eye, it is deprived of oxygen and nutrients, causing the tissue to deteriorate.⁴ Patients with retinal detachment usually complain of decreased vision, often described by patients as partial loss of vision or as if a curtain is covering part of their sight. During a physical examination, visual acuity will usually be found to be reduced when tested with a Snellen chart. Intraocular pressure may be measured as normal or tend to be low (<10 mmHg). Upon fundoscopy, a loss of the

fundus reflex will be seen due to the loss of transparency in the detached retinal layer. Additionally, the retina will appear grayish, lifted, and bulging, with blood vessels visibly undulating along the surface of the elevated or detached retina.⁵

Many factors can contribute to retinal detachment. In addition to myopia, conditions such as lattice degeneration, trauma, diabetic retinopathy, and ocular metastasis are some of the risk factors for retinal detachment.⁴ Additionally, sex and age also influence the occurrence of retinal detachment. Ludwig *et al*⁶ reported a higher prevalence of retinal reattachment surgery (RRD) in men, both emmetropic, myopic, and highly myopic, compared to women in each category. The underlying factor is likely due to the average axial length of the eye being greater in men. Contrary to this report and many others, Willis *et al*⁷ found, through multivariate analysis (adjusted for age and sex), that women have a 1.7 times higher likelihood of developing high myopia compared to men. Meanwhile, regarding age, Ludwig *et al*⁶ stated that the prevalence of retinal detachment peaks in the 5th decade of life, particularly with high myopia. This prevalence is similar to other studies that

mention that the peak of retinal detachment, particularly related to posterior vitreous detachment (PVD), occurs in the 6th decade of life.

The relationship between myopia and retinal detachment, as a common complication of myopia, has led to both aspects increasing concurrently. Landreneau *et al*⁸ suggested that there is a prediction of a myopia explosion in the future. At present, over 28% of the world's population suffers from myopia, and this figure is projected to rise substantially by 2050. It is estimated that by then, half of the global population, or around five billion individuals, may be affected.

Along with the predicted myopia explosion, research on the increase in retinal detachment has also been widely discussed. A recent study conducted in Scotland over the past ten years shows that rhegmatogenous retinal detachment (RRD), which involves retinal detachment with a tear, has become more common in the UK. This trend is partly due to the rising number of myopia cases, pseudophakia, and possibly other contributing factors.⁹

Similar research conducted in various regions has yielded comparable results. A study by Van Leeuwen *et al*¹⁰ found that the overall incidence of rhegmatogenous retinal detachment (RRD) had risen by 44% compared to data from 2009. This increase aligns with the growing prevalence of myopia. During the same period, the prevalence of mild, moderate, and severe myopia among individuals aged 55 to 75 years increased by 15.6%, 20.3%, and 26.9%, respectively. In Denmark, a study by Nielsen *et al*¹¹ revealed that the incidence of RRD had risen by over 50%, with variations observed based on age and sex. This significant increase was primarily linked to a rise in primary RRD surgeries among men aged 50 and older, with an annual increase of 1.7 ± 0.1 cases per 100,000 people.

Studies conducted in Asia have also indicated a rise in both the prevalence and incidence of retinal detachment. In China, the annual incidence of rhegmatogenous retinal detachment (RRD) consistently grew from 7.26 cases per 100,000 in 2015 to 10.00 cases per 100,000 in 2019, indicating an overall increase of 37.74%.¹² In Korea, the increase in RRD is particularly noticeable among individuals under 50 years old, while in those aged 50 and above, the incidence rise was only seen in male patients. The surge in cases among those under 50 is closely linked to the growing prevalence of myopia among the younger population in Asia.¹³

Research on the increasing incidence of retinal detachment has yet to be further explored in Indonesia. However, Fakhri *et al*¹⁴ in their study at the National Eye Center Cicendo Hospital in 2019, found that out of a total of 97 respondents, 75.3% of retinal detachment patients with tears were aged 36-45 years, 73.2% were male, and 71.1% of them had

myopia as a risk factor.

Many aspects of retinal detachment still need further investigation, including age, sex, etiology, type, location, morphology, laterality, visual acuity, and management. Meanwhile, research on retinal detachment in Indonesia remains very limited as a reference, both as clinical material and as a basis for future studies. Therefore, the objective of this study was to describe the characteristics of retinal detachment patients at Prof. Dr. I Goesti Ngoerah General Hospital during the period 2021–2023, including demographic data, etiology, type, detachment location, morphology, laterality, visual acuity severity, and management approaches.

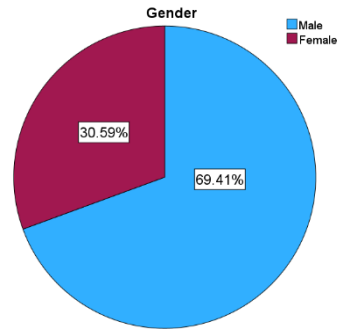
OBJECT AND METHOD

This quantitative observational study uses a cross-sectional method to determine the characteristics of retinal detachment patients. An analytical descriptive technique is employed to analyze the accessible population, which includes all retinal detachment patients at Prof. Dr. I Goesti Ngoerah General Hospital, Denpasar, Bali, between 2021–2023. Samples were taken from the accessible population based on inclusion and exclusion criteria. The inclusion criteria required retinal detachment patients with complete medical records, patients who received operative measures, and patients with etiology of trauma, myopia, diabetic retinopathy, eye infections, complications from surgical procedures, tumors, and other malignancies. On the other hand, patients were excluded from the study if they had incomplete or unclear (missing or deleted) medical records, if they relapsed or experienced recurrence after surgery, or if the type of retinal detachment was unknown.

Total sampling was used for this study, considering the number of samples was less than 85 people. The data was taken from the medical record sheet after obtaining research permission from the relevant hospital and ethics committee. The data was analyzed using SPSS (Statistical Product and Service Solutions) version 29 software to determine characteristics such as gender, age, etiology, type of retinal detachment, detachment location, morphology, laterality, visual acuity severity, and management. This study received approval from the ethics committee of the Faculty of Medicine at Udayana University, under the ethical approval letter number 0213/UN14.2.2.VII.14/LT/2024.

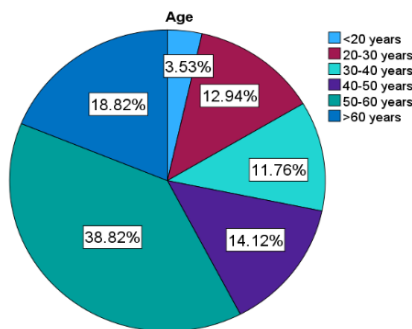
RESULT

In this study, the research subjects were retinal detachment patients who underwent surgical intervention and were registered in the medical records data at the Medical Record Installation of Prof. Dr. I Goesti Ngoerah Gde Ngoerah General Hospital from 2021 to 2023. Based on the results of this study, 85 patients who met the inclusion and exclusion criteria were included.



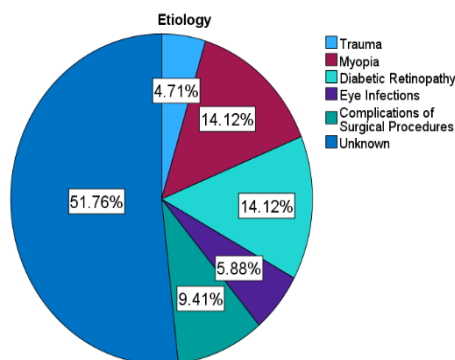
Pie Chart 1. Characteristics of Retinal Detachment Patients by Gender at Prof. Dr. I Goesti Ngoerah Gde Ngoerah General Hospital in 2021 – 2023

Based on pie chart 1, there are more male patients with retinal detachment than female patients, with percentages of 59 (69.41%) and 26 (30.59%), respectively.



Pie Chart 2. Characteristics of Retinal Detachment Patients by Age at Prof. Dr. I Goesti Ngoerah Gde Ngoerah General Hospital in 2021 – 2023

Based on pie chart 2, the youngest patient was 12 years old and the oldest was 78 years old. The age group between 50 and 60 years was the most common, with 33 patients (38.8%). Meanwhile, the age group with the fewest cases was those under 20 years old, with 3 patients (3.5%).



Pie Chart 3. Characteristics of Retinal Detachment Patients by Etiology at Prof. Dr. I Goesti Ngoerah Gde Ngoerah General Hospital in 2021 – 2023

Based on pie chart 3, the study's limitations resulted in the finding that the most common etiology of retinal

detachment was unknown, with 44 cases (51.8%). Meanwhile, the second most common etiologies of retinal detachment, with the same number and percentage, were

myopia and diabetic retinopathy, each with 12 cases (14.12%).

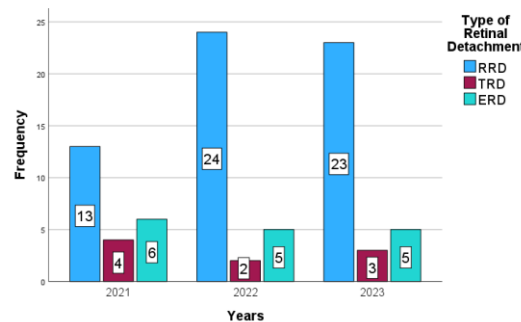
Table 1. Characteristics of Retinal Detachment Patients by Type of Retinal Detachment at Prof. Dr. I Goesti Ngoerah Gde Ngoerah General Hospital in 2021 – 2023

Variable	Frequency (n)	Percentage (%)
RRD	60	70.6
TRD	9	10.6
ERD	16	18.8
Total	85	100.0

Information: RRD = *Rhegmatogenous Retinal Detachment*
 TRD = *Traction Retinal Detachmen*
 ERD = *Exudative Retinal Detachment*

Table 1 shows the most common type of retinal detachment at Prof. dr. I Goesti Ngoerah Gde Ngoerah General Hospital

from 2021 to 2023 was RRD (Rhegmatogenous Retinal Detachment), with 60 patients (70.6%).



Bar Chart 1. Characteristics of Retinal Detachment Patients by Type of Retinal Detachment at Prof. Dr. I Goesti Ngoerah Gde Ngoerah General Hospital from 2021 to 2023 by Year

Based on bar chart 1, RRD can be distributed as 13 people in 2021, showing an increase of 24 people in 2022, and 23

people in 2023.

Table 2. Characteristics of Retinal Detachment Patients by Detachment Location at Prof. Dr. I Goesti Ngoerah Gde Ngoerah General Hospital in 2021 – 2023

Variable	Proportion		Total
	Yes	No	
Superior	33 (55%)	27 (45%)	60 (100%)
Temporal	37 (61,7%)	23 (38,3%)	60 (100%)
Inferior	35 (58,3%)	25 (41,7%)	60 (100%)
Nasal	34 (56,7%)	26 (43,3%)	60 (100%)
Macular hole	24 (40%)	36 (60%)	60 (100%)

Table 2 shows that the most common detachment location found in patients with RRD was temporal, with 37

individuals, accounting for 61.7%.

Table 3. Characteristics of Retinal Detachment Patients by Morphology at Prof. Dr. I Goesti Ngoerah Gde Ngoerah General Hospital in 2021 – 2023

Variable	Frequency (n)	Percentage (%)
<i>Break</i>	41	68.3
<i>Hole</i>	19	31.7
Total	60	100.0

Based on table 3, patients with RRD, morphology were more commonly found to have breaks compared to holes, with 41 (68.3%) cases of breaks and 19 (31.7%) cases of holes.

Table 4. Characteristics of Retinal Detachment Patients by Laterality at Prof. Dr. I Goesti Ngoerah Gde Ngoerah General Hospital in 2021 – 2023

Variable	Frequency (n)	Percentage (%)
OD (Unilateral)	40	47.1
OS (Unilateral)	39	45.9
ODS (Bilateral)	6	7.1
Total	85	100.0

Information: OD = *Oculus Dexter* OS = *Oculus Sinister*
ODS = *Oculus Dexter Sinister*

Based on table 3, the most common laterality of retinal detachment in patients was unilateral *Oculus Dexter* (OD), with 40 individuals, accounting for 47.1%. However, this difference was not highly significant compared to the unilateral *Oculus Sinister* (OS), which had 39 individuals, accounting for 45.9%.

Table 5. Characteristics of Retinal Detachment Patients by Visual Acuity Severity at Prof. Dr. I Goesti Ngoerah Gde Ngoerah General Hospital in 2021 – 2023

Variable	Frequency (n)	Percentage (%)
NLP – 1/300	53	62.4
1/60 – 2/60	16	18.8
3/60 – 6/60	16	18.8
Total	85	100.0

Information: NLP = *No Light Perception*

Table 5 shows that the most common visual acuity severity in retinal detachment patients was NLP – 1/300, with 53 individuals, accounting for 62.4%.

Table 6. Characteristics of Retinal Detachment Patients by Management at Prof. Dr. I Goesti Ngoerah Gde Ngoerah General Hospital in 2021 – 2023

Variable	Proportion		Total
	Yes	No	
RLP	74 (87.1%)	11 (12.%)	85 (100%)
Cryopexy	43 (50.6%)	42 (49.4%)	85 (100%)
PR	1 (1.2%)	84 (98.8)	85 (100%)
PPV	79 (92.9%)	6 (7.1%)	85 (100%)
SB	14 (16.5%)	71 (83.5)	85 (100%)

Information: RLP = *Retinal Laser Photocoagulation* PPV = *Pars Plana Vitrectomy*
PR = *Pneumatic Retinopexy* SB = *Scleral Buckling*

Table 6 shows that the most common management for retinal detachment patients was Pars Plana Vitrectomy (PPV), performed on 79 individuals, accounting for 92.9%.

DISCUSSION

Referring to the results of a study on the characteristics of retinal detachment patients based on gender at Prof. dr. I Goesti Ngoerah Gde Ngoerah General Hospital in 2021–2023, as shown in Pie Chart 1, the highest number of retinal detachment patients were male, with a percentage of 69.41%, compared to 30.59% for females. This finding is consistent with a study conducted at RSUP Sanglah Denpasar in 2018, which also showed that the male population was higher than females, with percentages of 53.85% and 46.15%, respectively.¹⁵ Similarly, a study by Radeck *et al*¹⁶ at the University Hospital of Regensburg, Germany, found that the male gender was more commonly associated with retinal detachment, with a percentage of 61.1%. A potential factor contributing to the higher prevalence of retinal detachment in males is the generally greater axial length of the eyeball in males.⁶ Research by Fan *et al*¹⁷ also highlighted that the axial length of the male eye is longer than that of females, indicating a basic biological factor influencing the difference in eye growth between males and females. Kuoliene *et al*¹⁸ found that body mass index, axial eye length, and refractive errors correlate in myopic adolescents, both male and female. Myopia, the most significant risk factor for retinal detachment, is associated with a higher body mass index, greater height, longer axial eye length, and a longer vitreous space. The study also observed notable differences in body size measurements between genders, with males being considerably taller and having a higher body weight than females. While the study did not specifically identify a significant gender difference in refractive status, the relationship between body size metrics, body mass index, refractive errors, and axial eye length indicates a positive correlation.

Based on Pie Chart 2 regarding the characteristics of retinal detachment patients by age at Prof. dr. I Goesti Ngoerah Gde Ngoerah General Hospital in 2021–2023, the most common age range was 50–60 years, accounting for 38.8%. This study is consistent with research conducted in Poland from 2013 to 2019, which showed that the average age of patients was 59.82 ± 14.51 years.¹⁹ Similar findings were also observed in a study at RSUP Sanglah in 2015, which reported that the largest group was in the 51–60 years age range, with a percentage of 57.7%.²⁰ Meanwhile, a study conducted at RSUP Sanglah in 2018 found that the largest group was in the 41–50 years age range, accounting for 53.85%.¹⁵ These studies align with the research by Ludwig *et al*,⁶ which stated that the prevalence of retinal detachment peaks in the 5th and 6th decades of life, with factors such as high myopia and posterior vitreous detachment (PVD). PVD, as an initial cause of retinal detachment, is influenced by age. Aging is related to the concentration of the vitreous

fluid, which is normally transparent and has a gel-like consistency, adhering tightly to the retina at the vitreous base, the optic nerve head, and the macula. As one ages, the vitreous undergoes an aging process. With increasing age, the vitreous will undergo liquefaction or gel breakdown, as well as structural changes that affect its attachment to crucial areas of the retina, such as the vitreous base, optic nerve head, and macula, making it more vulnerable to detachment. This explanation supports the higher prevalence of retinal detachment found in older age groups.^{21–23}

In the results shown in Pie Chart 3, the most common etiology of retinal detachment patients at Prof. dr. I Goesti Ngoerah Gde Ngoerah General Hospital in 2021–2023 was unknown etiology, accounting for 51.76%. This unknown etiology is due to the limitations of the research. Meanwhile, the second most common etiologies were myopia and diabetic retinopathy, both with an equal percentage of 14.12%. A study at RSUP Sanglah in 2015 reported that the most common predisposing factor for retinal detachment was myopia, accounting for 42.3%.²⁰ A study at Cicendo Eye Hospital in Bandung in 2019 also showed that myopia was the most significant risk factor for retinal detachment, with a percentage of 71.1%.¹⁴

In another study, the most common comorbidity found in retinal detachment cases in Poland was myopia, accounting for 13.26%, followed by diabetic retinopathy at 6.26%.¹⁹ Myopia, the most common etiology of retinal detachment, is associated with the condition of posterior vitreous detachment (PVD). Hayashi *et al*²⁴ conducted a study on patients adjusted for age and gender. They found that partial PVD develops much earlier in younger individuals with high myopia compared to those without myopia. These findings suggest that retinal pathology related to PVD, the early pathophysiology of retinal detachment, occurs earlier in patients with high myopia. This means that the younger an individual develops myopia, and the greater the progression of myopia, the earlier PVD can occur, making them more vulnerable to retinal detachment in the long term.

Table 1 shows the characteristics of retinal detachment patients according to the type of retinal detachment at Prof. dr. I Goesti Ngoerah Gde Ngoerah General Hospital from 2021–2023; the most common type of retinal detachment was rhegmatogenous, accounting for 70.6%. This result is consistent with the study by Nowak *et al*,¹⁹ which found that rhegmatogenous retinal detachment occurred in the majority of retinal detachment cases, at 42.03%. Regarding Table 1, when distributed by year of occurrence, the incidence of rhegmatogenous retinal detachment appears to have relatively increased from 2021 to 2023, as shown in Bar Chart 1. This aligns with the research by Xu *et al*,¹² which reported a 37.74% increase in annual cases of rhegmatogenous retinal detachment in 2019. A study conducted in France also found a rise in the incidence of rhegmatogenous retinal detachment. In 2011, the prevalence was 7.79 per 100,000 people, and it steadily increased each

year, reaching 11.81 per 100,000 in 2018.²⁵

The characteristics of retinal detachment patients based on detachment location at Prof. dr. I Goesti Ngoerah Gde Ngoerah General Hospital from 2021–2023, as shown in Table 2, revealed that the most common location of detachment was temporal, accounting for 61.7%. A study by Sung *et al*²⁶ found that the most common location of retinal detachment was in the superior region, with 56.8% in total retinal detachment (RRD) and 64.8% in partial RRD. Another study at RSUD Dr. Soetomo Surabaya reported that retinal detachment was most commonly found in the superotemporal region, at 34%.²⁷ Research at RS Prof. Dr. RD Kandou Manado also indicated that the most common location of retinal detachment was in the superotemporal region, with a prevalence of 38.90%.²⁸ Meanwhile, a study at RSUP Sanglah in 2018 found that the most common location of retinal detachment was in the inferior region, with a prevalence of 69.23%.¹⁵

Table 3 shows the characteristics of retinal detachment patients based on morphology at Prof. dr. I Goesti Ngoerah Gde Ngoerah General Hospital from 2021–2023, with the most common morphology being break, accounting for 68.3%. This is consistent with the study by Lukmana *et al*,²⁷ which found that the most common morphology in retinal detachment cases was tear, at 56%, while hole and atrophic hole with lattice was found in only 30% and 2% of cases, respectively. Meanwhile, according to Marcell *et al*,¹⁵ the most commonly found morphology was hole, with a prevalence of 69.23%.

The research results shown in Table 4 on the characteristics of retinal detachment patients based on laterality at Prof. dr. I Goesti Ngoerah Gde Ngoerah General Hospital from 2021–2023 revealed that the most common laterality was unilateral Oculus Dextra (OD), with a prevalence of 47.1%. A study at SMEC Eye Clinic from 2019 to 2022 found that retinal detachment was more commonly observed in unilateral cases, accounting for 85.7%.²⁹ Lukmana *et al*²⁷ also reported that the most common laterality found was in the right eye, with a prevalence of 60%. A similar study at RSUP Sanglah in a different year also showed that retinal detachment was more commonly found in the right eye, with a prevalence of 69.23%.¹⁵ One possible explanation for this is the dominance of the right eye in the majority of individuals, with 79.1% in a study by Deng *et al*.³⁰ This study also mentioned that there is a higher need for visual clarity in the dominant eye, leading to higher refractive error levels and a tendency for myopia, which is one of the risk factors for retinal detachment.

Based on the research results in Table 5 on the characteristics of retinal detachment patients according to visual acuity at Prof. dr. I Goesti Ngoerah Gde Ngoerah General Hospital from 2021–2023, the most commonly found visual acuity in retinal detachment patients was NLP–1/300, accounting for 62.4%. This finding is consistent with a study at RSUP Sanglah in 2018, which showed that the most common visual acuity in retinal detachment patients

was LP–1/200, with a prevalence of 69.23%.¹⁵ A study at RSUD Dr. Soetomo Surabaya found that the most common pre-operative visual acuity was <3/60, accounting for 91.25%.²⁷ The underlying cause of the severe visual acuity in retinal detachment patients, with many cases approaching blindness, has not been widely discussed in various journals. However, it is likely influenced by the patient's socioeconomic conditions. Individuals with a low socioeconomic background may struggle to afford regular eye examinations, which means they only seek medical care when their vision has deteriorated significantly. Another factor that could affect this is low educational levels, which may result in a lack of understanding about the importance of eye health and the early signs of retinal detachment.

Table 6 shows the most common management methods for retinal detachment patients in the study of patient characteristics based on the management at Prof. dr. I Goesti Ngoerah Gde Ngoerah General Hospital from 2021–2023 was Pars Plana Vitrectomy (PPV), with 79 patients, accounting for 92.9%. A study at Rotterdam Eye Hospital, Netherlands, showed that vitrectomy surgery was more commonly used, accounting for 92% of retinal detachment cases, particularly in macula-off cases.³¹ Research on retinal detachment at RSUD Dr. Soetomo Surabaya and RSUP Sanglah Denpasar also showed that PPV was more frequently used, with prevalence rates of 76.93% and 70.4%, respectively.^{15,27} In Poland, vitrectomy surgery and vitreous injections were also more commonly used to manage retinal detachment, with a prevalence of 49.80%.¹⁹ Mehmet *et al*³² also found that PPV was more commonly used in retinal detachment surgery, with a prevalence of 67.2%.

CONCLUSIONS AND SUGGESTIONS

Based on a study conducted at Prof. dr. I Goesti Ngoerah Gde Ngoerah General Hospital 2021 – 2023, which involved 85 patients who met the inclusion criteria, it was found that most patients with retinal detachment at the hospital during this period were male, aged 50 – 60 years, with an unknown etiology, and were diagnosed with regmatogenous retinal detachment. The detachment was mostly located in the temporal region, with a break morphology, unilateral laterality in Oculus Dexter (OD), and a visual acuity NLP – 1/300. The most common treatment provided was Pars Plana Vitrectomy (PPV).

The authors of the study recommend further investigation of the etiology or risk factors of retinal detachment during patient examinations. More comprehensive documentation should be made in the medical records of retinal detachment patients, especially regarding the presence or absence of a history of refractive disorders in the eyes, and further research is needed on the relationship between the increasing prevalence of rhegmatogenous retinal detachment and the rising prevalence of myopia.

RESEARCH LIMITATIONS

Based on the results of the study on the characteristics of retinal detachment patients at Prof. dr. I Goesti Ngoerah Gde Ngoerah General Hospital from 2021 to 2023, has several limitations to the research. These include the difficulty in obtaining information from medical records regarding the etiology of retinal detachment, resulting in a majority of cases being classified as unknown etiology, research bias related to the location of the detachment in medical records, where there are discrepancies between the clock-hour-based location and the quadrant-based location in both hardcopy and electronic medical records, research bias regarding visual acuity severity, as information on NLP and LP was not thoroughly explored and the challenge of accessing hardcopy medical records, leading to incomplete data, particularly for older records prior to hospitalization and operative procedures.

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